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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/702,322	10/31/2000	Vincenzo Antonucci	267.153-DIV	9779

20311 7590 07/18/2002

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EXAMINER

TRAN, THAO T

ART UNIT	PAPER NUMBER
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1711

DATE MAILED: 07/18/2002

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/702,322

Applicant(s)

ANTONUCCI ET AL.

Examiner

Thao T. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This is in response to the Amendment filed on April 25, 2002. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.
2. Claims 12-23 are currently pending in this application. Claim 24 has been cancelled.

Claim Objections

3. The objection to claim 1 is set forth in the prior Office Action of January 28, 2002.

Claim Rejections - 35 USC § 112

4. The rejection of claims 12-23 under 35 U.S.C. 112, first paragraph, is as set forth in the prior Office Action of January 28, 2002.
5. In view of the prior Office Action of January 28, 2002, the rejection of claims 12-23 under 35 U.S.C. 112, second paragraph, has been withdrawn due to the Amendment made thereto.
6. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 is indefinite because of the use of "said temperature". There are 3 different temperatures in claim 12: intended operating temperature, elevated temperature and ambient

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temperature. It is unclear to the examiner which temperature applicants are referring to. Specific temperature is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 12-17, 20, and 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimoda (US Pat. 6,017,455).

In regards to claim 12, Shimoda teaches a heat treatment process for a sulfonated polymeric membrane that is substantially amorphous prior to the heat treatment, the purpose of the heat treatment being to increase the degree of crystallinity of the membrane just as required in the claimed invention (see col. 12, ln. 56-67; col. 25, ln. 64 to col. 26, ln. 6).

In Example 1, Shimoda teaches a heat treatment of a polymeric proton exchange membrane (sulfonated polymeric membrane, which has an ion-exchange capacity of 0-0.5

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meq/g) (see col. 12, ln. 56-61), wherein the membrane is immersed in a 60°C solvent for 2 hours and further in a 200°C solvent for 2 hours, and the crystallinity in the membrane increases from less than 10% to 26% by weight (see col. 36, ln. 5-17). Since the heat treatment takes place at 200°C (elevated temperature), the intended operating temperatures would be inherently above 100°C.

Shimoda further teaches the membrane being washed at room temperature (ambient temperature) after the heat treatment (see col. 32, ln. 55 to col. 33, ln. 4).

In regards to claims 13-15, Shimoda teaches the use of the membrane at a temperature of 150°C and 180°C (intended operating temperatures) (see col. 36, ln. 28; col. 37, ln. 62-64), which are respectively below and above the glass transition temperature of the membrane ($T_g = 151^\circ\text{C}$) (see col. 35, ln. 50-51) and are more than 130°C.

In regards to claim 16, Shimoda teaches the percentage of crystallinity being determined using X-ray spectroscopy (see col. 35, ln. 12-13).

The examiner is interpreting "said temperature" in claim 17 as elevated temperature.

In regards to claim 17, Shimoda teaches the elevated temperature (200°C) higher than the intended operating temperature (150°C or 180°C).

In regards to claim 20, the arguments are as presented in claim 12. With respect to the use of the membrane, it has been held within the skill in the art that function or intended use would play little patentable weight when a structure is being considered for its patentability. See *In re Danly*, 120 USPQ 528, 531 (CCPA 1959); *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

In regards to claim 22, the arguments are as presented in claim 15.

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In regards to claims 23-24, Shimoda teaches the heat treatment temperature being 200°C and the operating temperature being 150°C (see Example 1) whereas the glass transition temperature of the membrane (T_g) being 151°C (see col. 35, ln. 50-51).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 18-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoda as applied to claim 12 above, and further in view of Murphy et al. (US Pat. 6,059,943).

Shimoda is as set forth in claim 12 above and incorporated herein.

In regards to claims 18-19, although Shimoda teaches the membrane wherein the polymer comprising a hydrocarbon bearing sulfate group (sulfonated polymeric membrane), the reference does not teach the polymer comprising fluorine, or specifically perfluorocarboxylic acid polymer.

In regards to claim 21, Shimoda does not teach the use of the membrane in a fuel cell that contains carbon monoxide.

Murphy teaches a method for conditioning a polymeric proton exchange membrane for operation at temperatures above 100°C, wherein the membrane polymer is perfluorosulfonic polymer (see col. 6, ln. 64 to col. 7, ln. 5; col. 8, ln. 37-44; col. 9, ln. 61-63).

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Although Murphy does not teach the concentration of carbon monoxide to be specifically 1%, Murphy does teach the membrane for use in fuel cells that may contain carbon monoxide, thus embracing the instantly claimed invention.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have substituted the membrane, as taught by Murphy for the one of Shimoda, because Murphy teaches that the membrane bearing perfluorosulfonic polymer would have high melting point, and hence, would be suitable for use in fuel cells that operate at high temperatures (above 150°C) and contain carbon monoxide (see col. 8, ln. 37-44).

Response to Arguments

11. Applicant's arguments filed on April 25, 2002 have been fully considered but they are not found persuasive.

On page 3, 3rd paragraph, and page 4, 1st paragraph, Applicant contends that the limitation "heating the membrane to a temperature at least 5°C above its operating temperature" have support in Examples 1 & 3, because Example 1 discloses the membrane being subjected to a "thermal ramp up to 160°C", whereas Example 3 discloses an operating temperature of 155°C. However, Example 1 teaches the membrane subjected to a thermal ramp up to 160°C and an operating temperature of 70°C or 100°C. And Example 3 teaches no thermal treatment and an operating temperature at 155°C. Hence, Examples 1 and 3 cannot be used as support for the recited limitation.

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Contact Information


12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao T. Tran whose telephone number is 703-306-5698. The examiner can normally be reached on Monday-Friday, from 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 703-308-2462. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

tt

July 10, 2002



NATHAN M. NUTTER
PRIMARY EXAMINER
GROUP ~~1741~~ (71)